Department of Executive Services
Finance and Business Operations Division
Procurement and Contract Services Section
Environmental Purchasing Program
www.kingcounty.gov/procurement/green
206-263-9294 TTY Relay: 711

Re-refined Antifreeze

INTRODUCTION

Automotive antifreeze is usually made from an ethylene glycol formulation. Such antifreeze can be re-refined to produce pure ethylene glycol, which can then be used to manufacture new antifreeze.

Antifreeze has been "recycled" in many ways. The most pure ethylene glycol is obtained with a fractional distillation process, in which ethylene glycol is isolated and contaminants are removed. Many filtration systems do not achieve the purity specifications required by warranties of equipment manufacturers. Filtration system users must be certain that the use of the filtered material is allowable under warranty requirements and they should routinely obtain laboratory test results to ensure that they are within warranty tolerances.

USAGE HISTORY AND EXPERIENCE

King County agencies, including Motor Pool, Solid Waste Operations, and the Renton Maintenance Facility have purchased antifreeze manufactured with re refined ethylene glycol since 1991. Metro Transit Division began using a concentrated re-refined ethylene glycol antifreeze product for buses in 1999. They introduce the necessary “additive packages” in the maintenance shops. In 2007, the county purchased 24,000 gallons of re-refined antifreeze, at a cost of over $85,000, and saved over $17,000 by its use.

King County agencies also recycled 20,000 gallons of ethylene glycol antifreeze back into new antifreeze, through the same contract used for the purchase of re-refined antifreeze, and paid $11,500 for this service last year.

BID AND CONTRACT SPECIFICATIONS

King County agencies purchase re-refined antifreeze, in ready-to-use and concentrated form, and antifreeze recycling services through a term-contract with a local vendor. This section contains excerpts (shaded area) from the Invitation-To-Bid that resulted in contract.

Technical Specification

A. The Contractor shall provide quality antifreeze capable of maintaining satisfactory transit operations in the King County area.

The antifreeze shall:

1. Have a useful life of twenty-four (24) months, 100,000 miles or longer from the date of installation.
2. Contain a precharge dosage of a Nitrate/borate approved SCA suitable for heavy-duty diesel engine use.
3. Must meet:

ASTM D-3306 – Standard Specification for Ethylene Glycol Base Engine Base Engine Coolant for Automobiles and Light-Duty Trucks;

ASTM D-4985 – Standard Specification for Ethylene Glycol Base Engine Coolant for Heavy Duty Diesel Service;

ASTM D-6210 – Standard Specification for Fully-Formulated Ethylene-Glycol-based Engine Coolant for Heavy-Duty Engines;

American Society for Testing and Materials (ASTM)
1916 Race Street
Philadelphia, PA 19103-1187

TMC RP-329 Fleet Purchasing Specification for Nitrite-Containing Ethylene Glycol Base Coolant

The Maintenance Council
American Trucking Association
2200 Mill Road
Alexandria, VA 22314

4. Must also meet or exceed engine manufactures warranty and maintenance specification coolant requirements for:

Cummins(M-11, ISC, ISL, ISM), Detroit Diesel (6V-92, Series 50), Catepillar (C-9)

B. If recycled ethylene glycol is used, it must be recycled through fractional distillation, re-refined and must meet or exceed ASTM e-1177 Standard Specification for Ethylene Glycol Base Coolant and be delivered in a concentrate that is not more than five (5%) percent water. On-site recycled product will not be considered.

C. Only ethylene glycol based antifreeze shall be provided in concentration form, that is five (5%) percent or less water. The specified antifreeze shall provide corrosion and cavitation protection and shall reduce the freeze point and increase the boiling point of the ethylene glycol based fluid.

D. Antifreeze requirements:

Item	Value	ASTM Test
Freezing Point Concentrate 50% Solution	Max. - 18°C Max. - 37°C	D 1177 D 1177
Boiling Point Concentrate 50% Solution	Max. - 149°C Max. - 108°C	D 1120 D 1120
Specific Gravity Concentrate 20°C	1.11 – 1.14	D 1122
Ash Content Concentrate	Max 1.5% by weight	D 1119
PH Value: 50% Solution (DI water)	8.0 – 11.0	D 1287
Reserve Alkalinity: 50% Solution (DI water)	Vendor supply	D 1121
Foaming Behavior Volume Increase Foam Break	Max. 75 ml Max. 3 sec	D 1881 D 1881
Effect on car finish	None	
Storage Stability	Min one (1) year	
Phosphate Content Silicon	0 250 PPM Max	Meets or exceeds ASTM D4985 for “low silicate ethylene glyco” engine coolant for heavy duty diesel engines requiring an initial charge of SCA (Supplemental Coolant Additive)
Corrosion Inhibition: Copper Solder	Industry Standard: 10 Max 30 Max	ASTM Test Method: D 2570 D 2570

Item	Value	ASTM Test
Brass Steel Cast Iron Aluminum	10 Max 10 Max 10 Max 30 Max	D 2570 D 2570 D 2570 D 2570
Glassware Corrosion Test: Copper Solder Brass Steel Cast Iron Aluminum	Industry Standard: 10 Max 30 Max 10 Max 10 Max 10 Max 30 Max	ASTM Test Method: D 1384 D 1384 D 1384 D 1384 D 1384 D 1384
Aluminum Heat Rejection (mg/cm²/week)	.5 mg/cm²/week	D 4340
Cavitation and Erosion	8 – 10 rating	D 2809

Test Solution: The total water hardness for the 50/50 mix must not exceed the grains per U.S. gallon, as per ASTM D 4985

Pricing

Item#	Qty	Description	Price Per Gallon	Extended Price
1	20,000 gal	50 – 50 Blend Antifreeze per the specifications identified in Section 7 Technical Specifications (Scope of Work)	$	$
2.	10,000 gal	Concentrate Antifreeze per the specifications identified in Section 7 Technical Specifications (Scope of Work)	$	$
			Total	$

FOR MORE INFORMATION

Green California - Antifreeze

VENDOR INFORMATION

King County's current supplier:

Emerald Services, (206)832-3100